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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/626,864	07/25/2003	Xuelong Shi	55071-268	9791

20277 7590 11/30/2005

MCDERMOTT WILL & EMERY LLP  
600 13TH STREET, N.W.  
WASHINGTON, DC 20005-3096

EXAMINER
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LEVIN, NAUM B

ART UNIT	PAPER NUMBER
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2825

DATE MAILED: 11/30/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/626,864

Applicant(s)

SHI ET AL.

Examiner

Naum B. Levin

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 19 September 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) 21 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 25 July 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                        | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)               | Paper No(s)/Mail Date. _____  |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>05/11/04</u> .  | 6) <input type="checkbox"/> Other: _____                                    |

### DETAILED ACTION

1. This office action is in response to application 10/626,864, and Response to election/restriction filed on 09/19/2005. Applicants have elected claims 1-20 for prosecution.

The possible invention of claim 21 requires a radiation sensitive material. Claim 1 only details reticle correction techniques, wherein the light is corrected, and exposed on any type of material, not simply radiation sensitive material. As such, the restriction is hereby made final.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-20 are rejected under 35 U.S.C. 102(b) as being unpatentable by Yamamoto et al. (US Patent 6,077,310).

3. As to claims 1, 8 and 15 Yamamoto describes:

(1) A method of generating a rule set utilized for automatically applying optical proximity correction techniques to a reticle design containing a plurality of features, said method comprising the steps of (col.5, ll.34-40):

generating a first set of rules for applying scatter bar assist features to said plurality of features (When, as shown in Table 4, the distance to the adjacent pattern is great (more than 2.5 m in this example), a rule that places an assist feature AF (see

FIG. 20B) of less than limit resolution may be included- col.17, ll.45-48 ... In addition, it is also possible to make a rule that places an assist feature (serif) in the pattern corner- col.17, ll.50-52) for a given illumination setting (Exposure and mask condition and meaning in the table 4 correspond with those in Table 3 - col.17, ll.29-30) (col.17, ll.28-52);

generating a second set of rules for applying biasing to said plurality of features (The correction rules are such that exposure wavelength=365 nm, NA=0.5, =0.7, and the halftone mask used has a amplitude transmittance of 5% and a phase difference of 180 degrees. The correction value corresponds to the distance by which the edge of interest is shifted in the direction perpendicular to that edge for correction. The sign "+" indicates the direction to widen a pattern on which the edge of interest is located, while the sign "-" indicates the direction to narrow that pattern for said given illumination setting - col.15, ll.59-67) for said given illumination setting (The correction values in Table 3 are calculated under the exposure and mask conditions described above - col.16, ll.10-11) ; and

forming a look-up table (rule table/correction table) containing said first set of rules and said second set of rules (table 4; col.17, ll.28-52);

(8), (15) A method/computer program of automatically applying optical proximity correction techniques to a reticle design containing a plurality of features, said method comprising the steps of (col.5, ll.34-40; col.32, ll.1-12):

generating a first set of rules for applying scatter bar assist features to said plurality of features (When, as shown in Table 4, the distance to the adjacent pattern is

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great (more than 2.5  $\mu$ m in this example), a rule that places an assist feature AF (see FIG. 20B) of less than limit resolution may be included- col.17, ll.45-48 ... In addition, it is also possible to make a rule that places an assist feature (serif) in the pattern corner- col.17, ll.50-52) for a given illumination setting (Exposure and mask condition and meaning in the table 4 correspond with those in Table 3 - col.17, ll.29-30) (col.17, ll.28-52);

generating a second set of rules for applying biasing to said plurality of features (The correction rules are such that exposure wavelength=365 nm, NA=0.5, =0.7, and the halftone mask used has a amplitude transmittance of 5% and a phase difference of 180 degrees. The correction value corresponds to the distance by which the edge of interest is shifted in the direction perpendicular to that edge for correction. The sign "+" indicates the direction to widen a pattern on which the edge of interest is located, while the sign "-" indicates the direction to narrow that pattern for said given illumination setting - col.15, ll.59-67) for said given illumination setting (The correction values in Table 3 are calculated under the exposure and mask conditions described above - col.16, ll.10-11) ; and

forming a look-up table (rule table/correction table) containing said first set of rules and said second set of rules (table 4; col.17, ll.28-52); and

analyzing each of said plurality of features with said first set of rules and said second set of rules contained in said look-up table to determine if either said first set of rules or said second set of rules is applicable to a given feature (as shown, for example,

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in the table 4 the rules in the fourth row correspond to the first set of rules, and the rules in the rows 1-3 correspond to the second set of rules- col.17, ll.31-42) ;

wherein, if either said first set of rules or said second set of rules is applicable to said given feature, said given feature is modified in accordance with the applicable rule (When, as shown in Table 4, the distance to the adjacent pattern is great (more than 2.5 m in this example), a rule that places an assist feature AF- col.17, ll.45-47).

4. As to claims 2-7, 9-14 and 16-20 Yamamoto recites:

(2), (9), (16) The method/program wherein said step of generating said first set of rules comprises the steps of defining a set of illumination settings to be utilized to image said reticle, performing an optical simulation of a plurality of lines having different pitches based on said set of illumination settings, recording said optimal position of said scatter bars (col.1, ll.56-67; col.2, ll.1-34; col.15, ll.39-55; col.17, ll.28-30; col.17, ll.53-63);

(3), (10), (17) The method/program, wherein said step of generating said second set of rules comprises the steps of generating a test reticle containing a set of selected test structures and a resist, imaging said test reticle on a substrate, generating a model representing the printing performance of said imaging system and utilizing said model to define said second set of rules (col.6, ll.51-67; col.7, ll.1-4);

(4)-(7), (11)-(14), (18)-(20) The method/program, wherein a biasing and a scatter bar requirement are defined for each of a plurality of distinct feature pitch intervals (col.15, ll.53-67; col.16, ll.1-35; col.17, ll.28-52; col.25, ll.56-67).

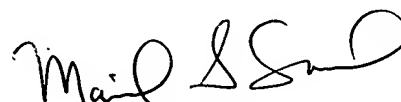
**Conclusion**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Naum B. Levin whose telephone number is 571-272-1898. The examiner can normally be reached on M-F (8:00-4:30).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew S. Smith can be reached on 571-272-1907. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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MATTHEW SMITH  
SUPERVISOR PATENT EXAMINER  
TECHNOLOGY CENTER 2800